U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM

SCIENTIFIC NAME: Rana onca

COMMON NAME: Relict leopard frog

LEAD REGION: 1

INFORMATION CURRENT AS OF: November 2005

STATUS/ACTION

___ Species assessment - determined we do not have sufficient information on file to support a proposal to list the species and, therefore, it was not elevated to Candidate status

___ New candidate

X_ Continuing candidate

___ Non-petitioned

X_ Petitioned - Date petition received: May 12, 2002

_ 90-day positive - FR date:

_ 12-month warranted but precluded - FR date:

_ Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:

a. Is listing warranted (if yes, see summary of threats below)? Yes

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? Yes

c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded.

In May 2003, the Service was petitioned to list the relict leopard frog as an endangered species under the Endangered Species Act (Center for Biological Diversity and Southern Utah Wilderness Alliance 2002). The petition was largely based on the restricted distribution of the known populations and low numbers of individuals of the species. We believe that listing the relict leopard frog at this time continues to be warranted. However, a comprehensive conservation agreement/strategy was completed in 2005 to improve the status of the species and ensure persistence of the species. Conservation is proceeding under the agreement and the species may be removed from candidate status following successful implementation of conservation measures for a minimum of one year and attainment of prescribed goals and objectives in the agreement and strategy for that time period. Annual work plans are developed and overseen by the Relict Leopard Frog Conservation Team to implement the measures in the agreement t and strategy.

_X_ Listing priority change

Former LP: _5_

New LP: _11_

____ Date when the species first became a Candidate (as currently defined): June 13, 2002

___ Candidate removal: Former LPN: ___

___ A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status.

___U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.

___ F – Range is no longer a U.S. territory.

___ I – Insufficient information exists on biological vulnerability and threats to support listing.

___ M – Taxon mistakenly included in past notice of review.

___ N – Taxon does not meet the Act's definition of "species."

___ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Amphibian/Ranidae

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Nevada, Arizona, and Utah

CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Clark County, Nevada, and Mohave County, Arizona

LAND OWNERSHIP: All known extant populations occur on LMNRA, administered by the NPS. One site which is believed to be extirpated occurs on private lands in Arizona (Littlefield).

LEAD REGION CONTACT: Diane Elam (CNO) 916-414-6464

LEAD FIELD OFFICE CONTACT: Michael Burroughs (702) 515-5230 (Nevada Fish and Wildlife Office, Lead)

BIOLOGICAL INFORMATION:

Species Description

The relict leopard frog (*Rana onca*) is a medium-sized frog (4.45 to 8.9 centimeters (1.75 to 3.5 inches) in length) in the family Ranidae (true frogs). Generally, the relict leopard frog is brown to grey above with greenish brown spots that are often reduced or obscure on the front of the body. The colors underneath are white to yellow with occasional grey or brown mottling. The dorsolateral folds are indistinct and end well before the groin. A light line runs from below the eye, under the tympanum, to behind the angle of the mouth (Stebbins 2003).

The species was considered extinct since the 1950s, until it was rediscovered at seven sites in three relatively small areas: (1) near the Overton Arm of Lake Mead, Nevada; (2) Black Canyon near the Colorado River below Hoover Dam, in Nevada; and (3) near Littlefield, Arizona.

Taxonomy

The taxonomy of relict leopard frogs has a confused and controversial history that centered around two major uncertainties. One long-debated uncertainty is whether relict leopard frogs and Vegas Valley leopard frogs represent distinct species or a taxonomic synonymy (see Jennings 1988 for review). The latter taxon was described from a series of specimens collected in the nearby Las Vegas Valley, Clark County, Nevada (Stejneger 1893). The other uncertainty is whether extant populations of leopard frogs within the Virgin River drainage, in the general range of relict leopard frogs, represent disjunct populations of lowland leopard frogs, a species described in 1984 (Platz and Frost 1984). Both of these historical uncertainties raised questions about the evolutionary distinctiveness of remnant populations within the Virgin River drainage and adjacent areas.

In a phylogenetic analysis, Jaeger et al. (2001) investigated evolutionary distinctiveness of leopard frog populations within the Virgin River drainage and adjacent areas in relationship to lowland leopard frogs from the main distribution of that taxon. Results showed that leopard frogs from the Virgin River south into Black Canyon of the Colorado River were genetically very similar, and that this group of populations was genetically distinct from lowland leopard frogs. Analysis of morphological characters of leopard frogs from the Virgin River and lowland leopard frogs from the primary range of that taxon showed that these 2 groups exhibit very similar appearances but represent opposite ends of a multivariate continuum. The type specimen of the relict leopard frog was very similar to samples collected from extant populations within the Virgin River drainage. Based on these results, Jaeger et al. (2001) concluded that populations from the Virgin River and Black Canyon area are relict leopard frogs.

The question of the systematic relationship between the relict leopard frog and the Vegas Valley leopard frog remains unresolved despite a long debate on the taxonomy. Historically, there were few actual comparisons between these taxa and the few comparisons suffered from a lack of relict leopard frog specimens. Most recently, an unpublished study of morphological characters of preserved specimens compared historical samples from the Las Vegas Valley (i.e., Vegas Valley leopard frogs) to those along the Virgin River (i.e., relict leopard frogs) as well as other southwestern leopard frog taxa (Jennings et al. 1995). This study showed substantial morphological differences between leopard frogs from the Las Vegas Valley and all of the other leopard frog taxa examined, including those from the Virgin River drainage. Eighteen morphological characters were analyzed to understand better the relationships among the traits. These characters included head width and length, lip height, internarial distance, tympanum diameter, spots, bars, and mottling. If Vegas Valley leopard frog populations, now presumed to be extinct, prove to be synonymous with the relict leopard frog, this would not change the taxonomic nomenclature because the name relict leopard frog would take precedence.

Jaeger et al. (2001), based on molecular, genetic, and morphological evidence, concluded that the relict leopard frog is an evolutionarily significant unit (Moritz 1994) distinct from what appears to be a closely related taxon, the lowland leopard frog. Under many species concepts, the differences between relict leopard frogs and the lowland leopard frog are sufficient to

distinguish them as separate species.

Habitat/Life History

Habitat generalists, relict leopard frogs historically probably occupied a variety of habitats including springs, streams, and wetlands characterized by clean, clear water, in both deep and shallow water, and cover/forage such as submerged, emergent, and perimeter vegetation. At higher elevations, organic muck and overhanging banks may have been important habitat features for overwintering (Jennings et al. 1995). Emergent or submergent vegetation provides cover and oviposition (egg-deposition) substrate (Jennings et al. 1995). A typical egg mass contains several hundred eggs. Current observations suggest that adults prefer relatively open shorelines where dense vegetation does not dominate (Bradford et al. in press). Relict leopard frogs reach sexual maturity in 1-2 years. Longevity data is limited for the relict leopard frog but the northern leopard frog (*R. pipiens*) is known to live at least 4-5 years.

Historical Range/Distribution

Based on museum specimens, recent surveys and collections, field studies/observations and literature, the known historical distribution for relict leopard frog is springs, streams, and wetlands within the Virgin River drainage downstream from the vicinity of Hurricane, Utah; along the Muddy River, Nevada; and along the Colorado River from the its confluence with the Virgin River downstream to Black Canyon below Lake Mead, Nevada and Arizona. All historical localities are at or within a few kilometers of these rivers. This apparent restriction in proximity to the main rivers, however, may be partially an artifact of historical collecting activities. Speculatively, the relict leopard frog may have also occurred at lowland localities along the Colorado River upstream from the confluence with the Virgin River, but no known specimens exist from this area (Jennings et al. 1995).

Current Range/Distribution

Relict leopard frogs are currently known to occur only in two general areas in Nevada: near the Overton Arm area of Lake Mead, and Black Canyon below Lake Mead. Both areas represent historical localities, with specimen records dating from 1936 at the Overton Arm area and from 1955 at Black Canyon. These two areas, encompassing maximum linear extents of only 3.6 and 5.1 kilometers (km) (2.2 and 3.2 miles (mi)), respectively, comprise a small fraction of the historical distribution of the species. Relict leopard frog populations may possibly occur in other localized areas. At present, the entire population occurs within the Lake Mead National Recreation Area (NMNRA) administered by the National Park Service (NPS). The current range of the relict leopard frog is much reduced (Jef Jaeger, University of Nevada, Las Vegas, pers. comm. 2004). Based on estimates of the historic distribution of the species, the U.S. Fish and Wildlife Service (Service) believes that the relict leopard frog currently occupies approximately 10 to 20 percent of its historic distribution.

THREATS:

A. The present or threatened destruction, modification, or curtailment of its habitat or range.

Connectivity among the extant populations has almost certainly been dramatically reduced as a result of damming the Colorado River. The formation of Lake Mead in 1935 apparently eliminated at least one population located between the Overton Arm and Black Canyon areas (Cowles and Bogert 1936), and presumably eliminated any potential for dispersal of frogs between these two areas. In Black Canyon, the control of river flow for power management since 1935 and the formation of Lake Mojave in 1951 presumably have dramatically impeded dispersal among the sites, which are separated from each other by 1.8 to 5.0 km (1.1 to 3.1 mi) via the Colorado River. The loss of connectivity is a result of a wider waterbody created when the Colorado River was dammed, thus preventing frogs from moving from one side of the river to the other. Here, the river level is influenced by Lake Mojave such that the canyon floor is never exposed, predatory game fishes are present in the river, and water is continually cool because it emerges from the bottom of Lake Mead. Nevertheless, downstream movement appears possible as suggested by the observations of individual relict leopard frogs at Willow Beach, 10 km (6 mi) downstream from the nearest known population (C. Fiegel, Willow Beach National Fish Hatchery, Service, pers. comm. 2004). Within the Overton Arm area, dispersal of relict leopard frogs may be possible between Blue Point and Rogers Springs. These sites are separated by a minimum of 1.6 km (1 mi). Moreover, two relict leopard frogs have been observed by NPS staff at a small spring located between Rogers and Blue Point Springs (R. Haley, NPS, pers. comm. 2004).

The causes for the population declines of this species are not entirely clear, but suggested factors include alteration of aquatic habitat due to agriculture and water development, and the introduction of exotic predators and competitors (Jennings 1988; Jennings and Hayes 1994). The formation of Lake Mead in 1935 and Lake Mojave in 1951 inundated scores of river miles and adjacent associated scattered wetlands. Moreover, wetland habitat has been converted to agriculture or urban development near the Virgin and Muddy Rivers in Utah, Arizona, and Nevada. Also, along the Virgin River, the hydrological regime has been substantially changed by upstream impoundments, diversions, and ground water pumping (BIO-WEST, Inc., 2001).

B. Overutilization for commercial, recreational, scientific, or educational purposes.

No known threats.

C. Disease or predation.

Little is known of pathogens and parasites of relict leopard frogs. Two important pathogens, chytrid fungus and viruses, have been the focus of recent research. Twenty nine adult/subadult leopard frogs, two larval leopard frogs, and two treefrogs collected from populations experiencing mortality events at eight sites were found to have characteristic lesions of chytrid fungus infections (*Batrachochytium dendrobatidis*) (Bradley, et al. 2002). All outbreaks in Arizona have been cool season phenomena. Presently, chytrid fungus has not been confirmed as a pathogen of relict leopard frogs. However, there is no reason to think that relict leopard frogs would be immune to this pathogen.

Exotic species, which are often implicated as serious predators and competitors of native ranid frogs in the western U.S., have become widely distributed along the Virgin, Muddy, and Colorado Rivers. Included among these are the American bullfrog, many species of exotic fishes, and red swamp crayfish (*Procambarus clarkii*) (Jennings and Hayes 1994). These species potentially predate all life stages of the relict leopard frog. Bullfrogs also negatively impact native amphibians through competition for prey and coversites. Crayfish and exotic fishes may be important predators on eggs and larvae of relict leopard frogs.

D. The inadequacy of existing regulatory mechanisms.

In Nevada, some legal protections are afforded the relict leopard frog by the Nevada Division of Wildlife (NDOW). The Nevada Administrative Code (NAC) 503.075 classifies the relict leopard frog as protected, which requires a permit to collect or possess them but not their habitat. Habitat protection for the relict leopard frog is provided by NAC 504.520 which prohibits alteration of a wetland or stream to the detriment of wildlife without a permit. Nevada Revised Statutes (NRS) 503.587 allows the Wildlife Commission to use its authority to manage land to carry out a program for conserving, protecting, restoring and propagating selected species of native fish, wildlife and other vertebrates and their habitats which are threatened with extinction and destruction. Also, NRS 533.367 states that before a person may obtain a right to the use of water from a spring or water that has seeped to the surface of the ground, he must ensure that wildlife which customarily uses the water will have access to it. However, the State engineer, who oversees all water rights, may waive this requirement for a domestic use of water.

In Arizona, some legal protections are afforded to the relict leopard frog by the Arizona Game and Fish Department (AGFD). The species is classified as Wildlife of Special Concern in the State, and Commission Order 41 of the AGFD regulations prohibits collection or hunting of relict leopard frogs in Arizona, except when done under the authority of a special permit. Protection under Commission Order 41 provides protection to individuals, not habitat.

In Utah, some legal protections are afforded to the relict leopard frog by the Utah Division of Wildlife Resources. The relict leopard frog is classified as a Sensitive Species in Utah. State of Utah Rule 657-3 prohibits the collection, importation, and possession of relict leopard frogs without a certificate of registration but provides no protection of habitat.

Legal protection is afforded to the relict leopard frog by the NPS at LMNRA under 36 CFR Part 2, which prohibits unauthorized possessing, destroying, injuring, defacing, removing, digging, or disturbing from its natural state any living or dead wildlife or fish, or the parts or products thereof. Extant populations of the relict leopard frog on NPS lands are afforded protection under the National Park Service Organic Act. This protection does not apply to populations outside the park boundary that may currently exist or that recolonize these areas. Protection of relict leopard frogs on NPS lands may be adequate to maintain the existing populations but inadequate to protect populations that become established elsewhere.

The Lacey Act (16 U.S.C. 3371 et seq.), as amended in 1982, provides some protection for the

relict leopard frog. This legislation prohibits the import, export, sale, receipt, acquisition, purchase, and engagement in interstate or foreign commerce of any species taken, possessed, or sold in violation of any law, treaty, or regulation of the United States, any Tribal law, or any law or regulation of any State. The relict leopard frog is not protected by the Convention on International Trade in Endangered Species of Wild Fauna and Flora, which regulates international trade.

Adequacy of these laws: State regulations support Federal regulations which focus on protection of relict leopard frogs (NDOW) and water resources (State Engineer). All known extant populations of the relict leopard frog, occur within the LMNRA which is managed by the NPS. As stated above, NPS regulations offer protection to the relict frog and its habitat, though the enforcement of regulations that prohibit transport and release of nonnative predators is difficult at best. LMNRA receives a high number of visitors each year which results in a proportionate number of law enforcement issues. Existing law enforcement staff appears to be unsuccessful in preventing the transport and release of nonnative predators at all sites occupied by relict leopard frogs on LMNRA. State law provides limited protection to relict leopard frogs and, to a lesser degree, their habitat. Although prior rangewide efforts were lacking to restore, or recover the species to approximately its former numbers and distribution, management is moving forward through captive rearing and translocation to improve the status of the species.

E. Other natural or manmade factors affecting its continued existence.

The relict leopard frog is further threatened by the low numbers of individuals within each population, some of which may not be viable. Amphibians are thought to have a metapopulation structure (i.e., groups of individuals inhabiting a system of habitat patches connected by migration across contiguous habitat). Populations that occur in isolated patches may be extirpated by stochastic events such that recolonization may not occur due to the distance of separation and absence of contiguous habitat. Genetic drift and inbreeding depression may also occur as a result of restricted gene flow associated with small, isolated populations, thus further threatening their persistence.

The threat of low numbers of individuals is being minimized through collection of eggs from wild and captively-held individuals, and headstarting the tadpoles to metamorphosis. Toadlets from this effort are considered for translocation with the goal of establishing new, self-sustaining populations within the historical range of the species. Currently, four translocation sites have been established and others are under evaluation (R. Haley, pers. comm. 2004).

CONSERVATION MEASURES PLANNED OR IMPLEMENTED

The NPS, in cooperation with various other Federal, State, and local partners, including the Service, developed a conservation agreement and strategy which is intended to improve the status of the species through prescribed management actions and protection. The conservation agreement and strategy was finalized in 2005 and implementation of conservation actions will proceed as described therein. The effort to develop the plan began in March 2001 with the formation of a group of biologists and resource managers, now referred to as the Relict Leopard

Frog Conservation Team. Conservation actions identified for implementation in the agreement and strategy include captive rearing tadpoles for translocation and refugium populations, habitat and natural history studies, habitat enhancement, population and habitat monitoring, and translocation. Ongoing and future management and conservation activities will proceed under the direction of the Relict Leopard Frog Conservation Team.

The 2005 Work Plan includes continuation of captive-rearing and translocation; planning for a relict leopard frog habitat project at the Willow Beach National Fish Hatchery; development of a habitat model; monitor natural and translocated populations; complete a metabolic study; develop field identification protocol for tadpoles; complete habitat improvement projects; initiate development of microsatellite markers for population genetics analyses; work with conservation partners to establish a refugium near the Muddy River in Clark County, Nevada.

SUMMARY OF THREATS:

The primary threats to the relict leopard frog include water diversions or developments, the presence of non-native predators and competitors, loss of habitat, and low numbers of individuals in metapopulations. No specific water developments or direct habitat losses are known that could result in impacts to the species. Numbers of individual and sites occupied by the frog are increasing through captive-rearing and translocation. Currently, the threats were determined to be moderate in magnitude and non-imminent.

LISTING PRIORITY: 11

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	2
		Subspecies/population	3
	Non-imminent	Monotypic genus	4
		Species	5
		Subspecies/population	6
Moderate to Low	Imminent	Monotypic genus	7
		Species	8
		Subspecies/population	9
	Non-imminent	Monotypic genus	10
		Species	**11***
		Subspecies/population	12

Rationale for listing priority number:

Magnitude: The magnitude of threats to the relict leopard frog is moderate based on its numbers and distribution, and presence of nonnative predators. Most populations of the relict leopard frog face one or more threats which may be long-term in duration. However, no populations are currently threatened by disease or any proposed anthropogenic activity that would reduce the numbers and distribution of any given population. All extant populations are protected by NPS and BLM resource management regulations. The Service believes that the magnitude of threats to the relict leopard frog is reduced from the 2004 level following development and finalization of the Conservation Agreement and Strategy in 2005, and implementation of recommended measures including establishment of additional populations within the range of the species.

Imminence: Threats are not considered imminent at this time. Efforts are underway to improve habitat and increase numbers through captive rearing and translocation. We do not know of any proposed projects that may result in further habitat degradation.

Yes Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed?

Is Emergency Listing Warranted? No. The threats to the frog are being monitored by the Relict Leopard Frog Conservation Team which convenes meetings approximately 2 to 4 times per year. Protection anticipated from emergency listing would not result in a substantial reduction of the threats to the relict leopard frog during the next 12 to 24 months. The threats to the species are non-imminent and will be further managed and minimized through implementation of the Conservation Agreement and Strategy. Further, we do not expect substantial losses of frogs from current threats. Implementation of conservation actions are underway that minimize the major threats to the species including habitat utilization studies, headstarting and translocation, habitat enhancement, and monitoring of natural and translocated populations.

Rationale for Change in Listing Priority Number (insert if appropriate):

The conservation agreement and strategy was finalized in July 2005. We recommend reducing the magnitude of threat from high to moderate which results in a change in the listing priority number from 5 to 11. All extant populations occur on Federal lands managed by NPS or BLM and since the last candidate review for the species, several releases of relict leopard frog tadpoles have occurred with the intent to increase the number of frogs in the wild. Other primary threats are moderate in magnitude. Immediacy of threats remains non-imminent which is unchanged from the last review. The Service believes that the plan will be effective in achieving adequate conservation for the relict leopard frog in accordance with the Service's Policy for Evaluation of Conservation Efforts. Following a minimum of one year of plan implementation, the Service anticipates removal of the relict leopard frog from candidate status.

DESCRIPTION OF MONITORING

The status of the species and conservation efforts are monitored by professional amphibian biologists and resource specialists representing academia, and land and resource management agencies that comprise the Relict Leopard Frog Conservation Team. The team meets in Boulder City, Nevada, a minimum of twice per year. From April 2003 through February 2005, the Relict Leopard Frog Conservation Team met 12 times. Literature in unpublished reports, herpetological journals, peer-reviewed publications, and information in a petition to list the relict leopard frog as an endangered species (Center for Biological Diversity and Southern Utah Wilderness Alliance 2002) form the knowledge base for the relict leopard frog. Active monitoring of natural and translocated populations occurs approximately bimonthly and involves visits to all known sites occupied by relict leopard frogs. Some sites are monitored more frequently than bimonthly. Amphibian biologists most familiar with ranids in the southwestern U.S. believe this level of monitoring is appropriate given the biology of the species and threats. Monitoring is developed to determine and document population viability, for evaluation and documentation of population trends, and for assessing the success or failure of management activities. Extant populations are monitored following schedules and protocols identified in the Conservation Agreement and Strategy.

Recent survey efforts/information:
A total of 64 localities were searched following rediscovery of the relict leopard frog; 12 of which were historical localities for relict leopard frog. Some other historical localities were not searched because either suitable habitat is no longer present, or the site could not be reliably located. Leopard frogs were found at only seven sites (Jaeger et al. 2001), two of which subsequently are believed to have been extirpated (Littlefield, Arizona and Corral Spring, near the Overton Arm of Lake Mead, Nevada). All seven localities were either historical localities (Littlefield; Blue Point, Rogers, and Corral Springs) or within a few kilometers of historical localities (Boy Scout, Salt Cedar Tributary, and Bighorn Sheep Springs). In addition, two leopard frogs have been observed on different occasions in 2000 and 2001 at the fish hatchery at Willow Beach, Arizona, located 10 km (6 mi) downstream from Bighorn Sheep Spring in Black Canyon (C. Fiegel, pers. comm. 2000). One of these frogs was collected and confirmed as R. onca based on mitochondrial DNA sequence similarity (C..Fiegel, pers. comm. 2001). This individual was likely swept downstream from the occupied sites in Nevada. In comparison, the current distribution of the relict leopard frog is markedly less than the historic distribution.

Bighorn Sheep Spring (NV): On September 10, 2004, surveyors observed 78 adults, 13 juveniles, and 59 tadpoles. On October 14, 2004, surveyors observed 354 adults, 19 juveniles, and 69 tadpoles. Sisty-four adults (including 3 pairs in amplexus), 6 tadpoles, and 27 egg masses were observed on January 21, 2005.

Blue Point Spring (NV): On October 16, 2004, biologists observed 32 adults and 3 juveniles. On February 5, 2005, biologists observed 2 egg masses and tadpoles of different ages, and collected 50 freshly hatched tadpoles for headstarting.

Boy Scout Spring (NV): On October 13, 2004, biologists located 3 adults. On January 27, 2005, one adult and 3 egg masses were observed.

Roger's Spring (NV): During surveys conducted on September 24, 2004, and February 10, 2005, no frogs or egg masses were observed. One frog was seen on October 28, 2004.

Salt Cedar Spring (NV): Two adults and at least 12 tadpoles were observed on December 10, 2004, by a park employee. On January 27, 2005, biologists located 2 adults, one hatched egg mass, and one large tadpole.

Reintroduction/Translocation Efforts:
As of February 16, 2005, tadpoles and frogs produced from egg masses collected at Bighorn Sheep Spring, Blue Point Spring, or Boy Scout Spring and in captivity at the Willow Beach National Fish Hatchery have been released at the four sites identified below.

Release Site	**No. tadpoles released**	**No. frogs released**
Sugarloaf Spring, AZ	-	325 since May 2003
Pupfish Refuse, NV	-	391 since October 2003
Goldstrike Canyon, NV	879 since April 2004	-
Grapevine Spring, AZ	905 since April 2004	-
Total	**1,784 tadpoles**	**716 frogs**

In May 2003, the Service fish hatchery at Willow Beach, Arizona was approved as a captive-rearing facility for relict leopard frogs. On February 17, 2004, a pair of frogs produced the first clutch of eggs at the facility where 11 adults are maintained; another clutch of eggs from a different female was observed on May 14, 2004. These frogs have been or will be released at translocation sites approved by the Relict Leopard Frog Conservation Team (C. Fiegel, pers. comm. 2004).

COORDINATION WITH STATES
Indicate which State(s) (within the range of the species) provided information or comments on the species or latest species assessment:

Nevada, Arizona, and Utah comprise the extent of all historical or current relict leopard frog populations (natural and introduced). As participating representatives on the Relict Leopard Frog Conservation Team, biologists from the Nevada Department of Wildlife and Arizona Game and Fish Department have been closely involved in developing the agreement and strategy during 2004-2005 and have contributing much valuable information of the species. Utah Division of Wildlife Resources continues to support the conservation efforts but have decided to limit their involvement with the team due to funding constraints and higher priorities.

Indicate which State(s) did not provide any information or comments: None.

LITERATURE CITED

BIO-WEST, Inc. 2001. An ecological evaluation of the lower Virgin River riparian corridor:

final report. Submitted to the Southern Nevada Water Authority, Las Vegas, Nevada.

Bradford, D.F., A.C. Neale, M.S. Nash, D.W. Sada, and J.R. Jaeger. Habitat patch occupancy by the red-spotted toad (Bufo punctatus) in a naturally fragmented, desert landscape. Manuscript in review.

Bradford, D.F., J.R. Jaeger, and R.D. Jennings. Status and distribution of remnant populations of the relict leopard frog (Rana onca). Manuscript in preparation.

Bradley, G. A., P. C. Rosen, M. J. Sredl, T. R. Jones, and J. E. Longcore. 2002. Chytridiomycosis in native Arizona frogs. Journal of Wildlife Diseases 38(1):206-212.

Center for Biological Diversity and Southern Utah Wilderness Alliance. 2002. Petition to list the relict leopard frog as an endangered species under the Endangered Species Act. Submitted to the Secretary of Interior, May 8, 2002.

Cowles, R.B., and C.M. Bogert. 1936. The herpetology of the Boulder Dam region (Nevada, Arizona, Utah). Herpetologica 1:33-42.

Jaeger, J.R., B.R. Riddle, R.D. Jennings, and D.F. Bradford. 2001. Rediscovering Rana onca: Evidence for phylogenetically distinct leopard frogs from the border region of Nevada, Utah, and Arizona. Copeia 2001:339-354.

Jennings, R.D., B.R. Riddle, and D.F. Bradford. 1995. Rediscovery of Rana onca, the relict leopard frog, in southern Nevada with comments on the systematic relationships of some southwestern leopard frogs (Rana pipiens complex) and the status of populations along the Virgin River. Report prepared for Arizona Game and Fish Dept., U.S. Bureau of Land Management, Las Vegas Valley Water District, U.S. National Park Service, and Southwest Parks and Monuments Association. 71 pp.

Jennings, M.R. 1988. Rana onca Cope, relict leopard frog. Catalogue of American Amphibians and Reptiles 417:1-2.

Jennings, M.R., and M.P. Hayes. 1994. Decline of native ranid frogs in the desert southwest. Pp. 183-211 in P.R. Brown and J.W. Wright (eds.) Herpetology of the North American Deserts, Southwestern Herpetologists society, Special Publ. No 5.

Jennings, R.D., B.R. Riddle, and D.F. Bradford. 1995. Rediscovery of Rana onca, the relict leopard frog, in southern Nevada with comments on the systematic relationships of some southwestern leopard frogs (Rana pipiens complex) and the status of populations along the Virgin River. Report prepared for Arizona Game and Fish Dept., U.S. Bureau of Land Management, Las Vegas Valley Water District, U.S. National Park Service, and Southwest Parks and Monuments Association. 71 pp.

Linsdale, J.M. 1940. Amphibians and reptiles in Nevada. Proceedings of the American

Academy of Arts and Science 73:197-257.

Marsh, D.M., and P.C. Trenham. 2001. Metapopulation dynamics and amphibian conservation. Conservation Biology 15:40-49.

Moritz C. 1994. Defining 'Evolutionarily Significant Units' for conservation. Trends Ecological Evolution 9: 373-375.

Platz, J.E. 1984. Status report for Rana onca. Unpublished report submitted to Office of Endangered Species, U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 27 pp.

Platz, J.E. and J.S. Frost. 1984. *Rana yavapaiensis*, a new species of leopard frog (*Rana pipiens* complex). Copeia (4): 940-948.

Stejneger, L. 1893. Annotated list of the reptiles and batrachians collected by the Death Valley Expedition in 1891, with descriptions of new species. North American Fauna (7): 159-228.

APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve: /s/ Paul Henson April 26, 2006
Acting CNO Manager, Fish and Wildlife Service Date

Concur: _____ August 23, 2006
Acting Director, Fish and Wildlife Service Date

Do not concur: _____
Director, Fish and Wildlife Service Date

Date of annual review: November 9, 2005
Conducted by: Michael Burroughs, Southern Nevada Field Office, Las Vegas, Nevada